



Cholangiocellular Cancer Topical Issues of Modern Ultrasound Diagnosis

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Abstract: To determine the role of modern ultrasound techniques in the diagnosis of cholangiocellular carcinoma. Method. We analyzed the results of a comprehensive ultrasound of 100 patients with cholangiocellular cancer (CCC) aged 20 to 80 years. Result. The results showed high information content of ultrasound diagnostics in determining the expansion of the bile ducts, the spread of the tumor to the liver and lymph nodes. Conclusions. The high information content of ultrasound allows us to recommend this research method for widespread use in planning surgical treatment.

Key words: cholangiocellular carcinoma; ultrasonography; diagnostics.

Cholangiocellular carcinoma (CCC), or cholangiocarcinoma, is a malignant neoplasm of the bile ducts. It is difficult to diagnose due to the anatomy, distribution, and lack of specific diagnostic criteria. CCC accounts for 3% of all hepatobiliary tumors, but is rapidly increasing worldwide.

Currently, cholangiocarcinoma is classified into the following types according to its anatomical location along the bile duct system: intrahepatic and extrahepatic. Intrahepatic cholangiocarcinoma occurs within the liver parenchyma, while extrahepatic cholangiocarcinoma involves the bile duct system within the hepatoduodenal ligament and gallbladder. In turn, extrahepatic is subdivided into cholangiocarcinoma around the gate of the liver and distal extrahepatic cholangiocarcinoma. Proximal extrahepatic cholangiocarcinoma is also called hilar, hilus, or Klatskin tumor. The form of CCC around the hilum of the liver is proximally separated from the intrahepatic bile ducts of the second order and distally separated by the cystic duct. Cholangiocarcinoma types differ in their biological properties and therapeutic management. Appropriate separation of patients regarding the anatomical location and stage of cholangiocarcinoma determines the treatment strategy. The incidence of intrahepatic tumors is 5-30%, around the gates of the liver - 40-70%, peripheral - 20-30%.

The incidence of intrahepatic cholangiocarcinoma has increased over the past three decades, while the incidence of hilar and peripheral extrahepatic cholangiocarcinoma remains stable.

Intrahepatic bile duct tumors, especially those with exophytic growth, appear as hypoechoic masses that are difficult to differentiate from hepatocellular carcinoma and liver metastases. Extrahepatic cholangiocarcinomas are difficult to visualize with ultrasound because of gas in the stomach and duodenum. The sensitivity, specificity and accuracy of ultrasound is 85%, 76% and 84% for the

localization of CCC in the hilum of the liver, 59%, 50% and 57% for the middle part of the common bile duct and 33%, 42% and 36% for the suprapancreatic part, respectively. Therefore, the expansion of the bile duct on ultrasound tomograms is an important sign of early diagnosis of bile duct cancer and a reason for conducting a larger examination using other informative methods.

Ultrasound symptom complex in patients with hilus cholangiocarcinomas include: tumor thickening of the walls of the ducts with the presence of a nodular formation in the projection of the proximal bile ducts, often increased echogenicity, expansion of the peripheral bile ducts, changes in the intrahepatic biliary anatomy. Also important is the narrowing of the lumen of the ducts in the area of the neoplasm in the hilum of the liver, fibrous changes in the area of tumor growth, in the area of the hilum of the liver and along the intrahepatic bile ducts.

The use of color Doppler ultrasonography will help to identify hepatic parenchymal involvement and evaluate vascular invasion. Sensitivity in gilus detection cholangiocarcinoma is 57%, specificity -94%, but the results depend on the size of the formation. Ultrasound reveals involvement of the portal vein in 93% of cases, and angiography - in 90%. The sensitivity and specificity of duplex ultrasonography in detecting portal vein involvement is 93% and 99%, respectively.

Ultrasound is the method of choice for interventional procedures such as percutaneous transhepatic cholangiography and drainage of peribiliary abscesses. The development of new methods for examining the bile ducts has led to the use of ultrasound in endoscopy - endoscopic ultrasound (EUS) and in cholangiopancreatography - transpapillary intraductal ultrasound.

Endoscopic ultrasound (EUS) is performed during the examination of the duodenum and allows the examination of the gallbladder and bile ducts to the level of the bifurcation, as well as vessels and lymph nodes with high resolution without attenuation of the echo signal and without the influence of gastrointestinal gas. The indication for EUS may be a diagnostic search for determining the nature of bile strictures in patients without a definite diagnosis after unsuccessful ultrasound, CT, MRI and ERCP with biopsy. If thickening of the walls of the bile ducts is detected, the presence of uneven, intermittent external borders of the bile ducts, one can suspect the malignant nature of the stricture.

The advantage of EUS lies in the ability to perform ultrasound-guided needle biopsies of tumors or enlarged lymph nodes. But, one of the main problems associated with puncture under ultrasound guidance is the high risk of implantation metastasis when the needle passes through the peritoneum and omentum. So during laparotomy in 83% of patients who underwent transperitoneal puncture or biopsy, peritoneal metastases were found. For this reason, performing an EUS-guided biopsy of a primary bile duct tumor is generally considered a contraindication to subsequent liver transplantation due to an increased risk of recurrence.

The method of choice may be intraductal sampling of biopsy material. Conducting EUS in patients with suspected malignant duct formations changes the tactics of treatment, including surgery, in 62-84% of cases. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy reach EUS 86%, 100%, 100%, 57% and 88%, respectively. When using EUS in patients with jaundice and unexplained dilatation of the common bile duct on standard ultrasound tomograms, the sensitivity and specificity in the diagnosis of a tumor were 100% and 100%, respectively.

Intraductal ultrasound is performed using high-frequency ultrasound transducers placed in the common bile duct. The transducer is inserted into the endoscopic canal transpapillary, retrograde during ERCP. It was found that the signs of malignancy included: intraductal or exophytic tumor growth, tumor size more than 10 mm, discontinuity of the bile duct wall. Malignant stricture of the bile ducts on intraductal ultrasound looks like a hypoechoic infiltration of the duct wall with jagged edges. In cases where a tumor is not detected on CT scans in the presence of a ductal stricture, intraductal ultrasound increases the diagnostic accuracy of ERCP from 58% to 90%.

A discrepancy between the diagnosis at admission and at discharge was observed in 17 (14.1%) patients who, at admission, were previously diagnosed with hepatocellular cancer - 5, pancreatic cancer - 5, cancer of the Vater's nipple - 3, neoplasms of other localizations with metastases in liver - 4.

Disease of the bile ducts often leads to their obstruction. Therefore, the first clinical manifestation of the disease in most patients is the development of obstructive jaundice. In our group of patients, obstructive jaundice was observed in 73 (60.8%) cases. Most often, signs of obstruction were observed when the tumor was localized in the hilum of the liver and distal sections of the extrahepatic bile ducts - 93.9% and 100%, respectively. On the contrary, with an intrahepatic location of the neoplasm, obstructive jaundice occurred only in 8.5% of patients.

It is quite easy to visualize the dilatation of the bile ducts by ultrasound, but if the dilatation of the ducts is insignificant, then color Doppler mapping was used to distinguish them from the vessels. In addition, under the control of ultrasound, it is possible to perform the procedure of percutaneous transhepatic stenting of the ducts, and further assess the condition of the stent in order to correct it if necessary.

Ultrasound signs were considered depending on the localization of the tumor. With the portal and distal type of CCC, duct expansion was less common than it actually was due to therapeutic decompression performed before ultrasound in the form of minimally invasive operations (PTCS, endoscopic papillosphincterotomy, etc.). Intrahepatic CCC had the following ultrasound signs: the tumor was represented by a nodular formation (100%), larger than 4.0 cm (89.4%), intraorgan metastases were present in 89.4%, obstructive jaundice occurred only in 8.5% of patients. With an intrahepatic type of tumor, nodular formations ranging in size from 2 to 19 cm were determined in the liver in all cases. The structure of an intrahepatic tumor is hypoechoic at small sizes, and with an increase in size it becomes isoechoic or mixed. With large tumor sizes, satellites can be determined near the main node, as in hepatocellular cancer. An important feature of the ultrasound picture of CCC is the frequent absence of clear boundaries with the liver parenchyma. With color Doppler mapping in the CCR nodes, a wide variety of vascularization options can be determined without any features. Thus, we can talk about the absence of ultrasound pathognomonic signs of intrahepatic CCC, which would make it possible to distinguish it from other malignant liver tumors.

Klatskin's tumor was characterized by the presence of a tumor (69.4%), nodular (32.7%) and infiltrative (26.5%) type, dilated ducts (67.6%). With Klatskin's tumor, a nodular formation can also be visualized (32.7%), but more often an infiltrate along the ducts or an intraductal tumor (36.7%) is determined. The size of the nodular formations varied from 2.0 to 16.0 cm, and they were localized in the segments around the hilum of the liver and lobar ducts. Spread to the liver occurred when the tumor process went beyond the ducts, therefore, using ultrasound in the case of visualization of intrahepatic formations, it is impossible to differentiate intrahepatic and portal types of CCC. That is, the formation in the gates of the liver will be visualized on ultrasound tomograms not as an isolated lesion of the ductal system, but as an intrahepatic formation. In the presence of an infiltrate along the ducts, ultrasound measured its length and width, assessed its structure and contours.

Distal cholangiocarcinoma was manifested by obstructive jaundice (62.5%), formations were rarely visualized (62.5%), but if they were detected, in most cases an infiltrative type of growth was noted, and liver metastases were not detected in any case. The distal type of CCC, in cases where it could be visualized, was also most often characterized by infiltrative and intraductal growth - 7 (77.8%) of 9 cases. Sometimes infiltration was manifested only by thickening of the walls of the common bile duct; in these cases, the wall thickness and length of the altered duct were measured.

The tumor was determined by ultrasound only in 90 (75%) patients, with intrahepatic type in 100%, portal type - in 69.4%, distal type - in 37.5% of cases. That is, it is most difficult to diagnose neoplasms that are localized in the distal sections of the common bile duct. Intraductal formations were defined as echogenic masses in the lumen of the dilated ducts; when they are visualized, in addition to the size of the tumor, it is necessary to assess the involvement of the duct wall and the extension beyond it. A feature of infiltrative growth of cholangiocarcinomas was revealed: infiltration can be along the outer contour of the ducts, in which case its structure is hyperechoic, if infiltration occurs due to thickening of the walls of the ducts, then its structure is hypoechoic.

Metastases in the liver were found more often in the intrahepatic form and never in the distal cholangiocarcinoma. The sizes of metastases in the liver were 1-4 cm. Lymph nodes were found approximately the same in all types of CCC, ranging in size from 1.0 cm to 13 cm. .01).

With an intrahepatic location of the tumor, its diagnosis was not difficult for imaging methods. The situation with hilar CCC was somewhat worse, and the most difficult was the diagnosis of the distal type of CCC. Of the frequently used radiation methods for diagnosing high values of the determined parameter, the method of MRI (86.5%) and MRCP (91.3%) reached. Ultrasound was inferior to CT, MRI and MRCP in the diagnosis of extrahepatic CCC, although the difference in general indicators was not too significant, especially with the CT method, but it was in the diagnosis of distal CCC that the sensitivity of MRI (68.7%) exceeded US (37.5%). almost doubled.

The analysis of patients with CCC revealed the involvement of vessels in the tumor process in 14 (11.7%) patients. With intrahepatic type of CCC in our group of patients, vascular invasion and tumor thrombosis were observed in 8.5% of cases, with portal type - in 18.4%, with distal type - in 4.2%. Vessels were most often involved in the tumor process when the tumor was located in the hilum of the liver, which is explained by the close location of the vessels in relation to the lobar and common hepatic ducts.

It was noted that the sensitivity of ultrasound (35.7%) methods in the diagnosis of vascular involvement is significantly lower than angiography (66.7%) and surgical revision (81.8%). Sensitivity values at angiography exceeded other preoperative data. But due to the increase in the number of CT and MRI with intravenous contrast in recent years, the frequency of using direct angiography in the diagnosis of CCC has decreased, but still remains quite high (37.5%) compared to its use in HCC (13.3%).

Lymph nodes were removed in 79 (87.8%) of 90 operated patients, of which a metastatic lesion was found in 26 cases, that is, in every third operated CCR patient (32.9%). Surgery for cholangiocarcinoma lymph node dissection should be performed in all cases, but in our group of patients, 11 (12.2%) patients underwent diagnostic laparotomy due to the prevalence of the tumor process and, as a result, the refusal of surgery.

Most often, lymph nodes were removed located in the hepatoduodenal ligament (79.7%), less often - in the parapancreatic region (16.4%), along the common hepatic artery (2.6%) and in the aortocaval space (1.3%). In the preoperative examination, the best method for diagnosing the spread of the tumor process to the lymph nodes is ultrasound (sensitivity - 61.5%), which exceeded the data of CT and MRI (sensitivity - 61.5% and 43.7%, respectively).

The ultrasound strategy in diagnosing CCC differs depending on the type of CCC. The primary task is to identify the expansion of the bile ducts, determine the level of the block, control the condition and location of the stent. With the intrahepatic type, the effectiveness of ultrasound is very high, is on the same level as CT and consists in detecting neoplasms in the liver parenchyma. In the extrahepatic type of CCC, the role of ultrasound is to detect formation in the projection of the ducts, infiltration along the ducts, and intraductal formation. With the help of ultrasound, it is possible to conduct a biopsy of

the formation, to obtain additional information during the operation. The results showed high information content of ultrasound diagnostics in determining the expansion of the bile ducts, the spread of the tumor to the liver and lymph nodes. But to establish distal and portal cholangiocarcinoma, abdominal ultrasound should be supplemented with MRI, MRCP, cholangiography, and endoscopic ultrasound.

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